Name _____ Date _____ Period 5

Similarity and Transformations

Lesson Objective IWBAT perform and describe similarity transformations

A dilation is a transformation that preserves shape but NOT size.
- ➔ So, a dilation is a nonrigid motion.

A similarity transformation is a dilation OR a composition of rigid motions and dilations.

Similar Figures Two geometric figures are similar figures if and only if there is a similarity transformation that maps one of the figures onto the other.
- ➔ Similar figures ALWAYS have the same shape, but *not necessarily the same size*.

Congruence transformations preserve length and angle measure.

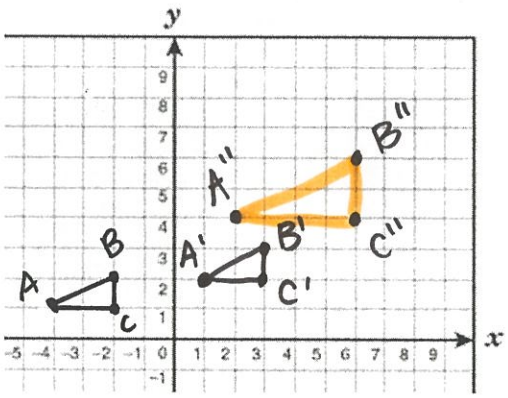
Think About It... If a dilation has a scale factor, k, what are the value(s) for k so that the dilation is ALSO a congruence transformation?

$k=1$ or $k=-1$

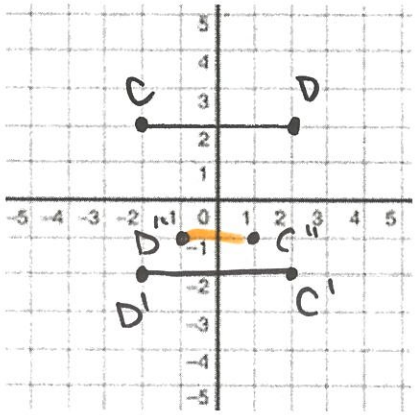
- ➔ So, when the scale factor of the dilation(s) is NOT equal to 1 or -1, similarity transformations preserve angle measure ONLY.

Examples

1. Graph ΔABC with vertices A(-4, 1), B(-2, 2) and C(-2, 1) and its image after the similarity transformation:
   Translation: $(x, y) \rightarrow (x + 5, y + 1)$
   Dilation: $(x, y) \rightarrow (2x, 2y)$



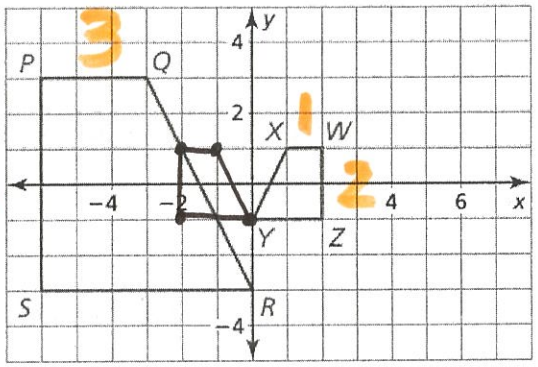
2. Graph $\overline{CD}$ with vertices C(-2, 2) and D(2, 2) and its image after the similarity transformation:
   Rotation: 180° about the origin
   Dilation: $(x, y) \rightarrow \left(\frac{1}{2}x, \frac{1}{2}y\right)$



3. Describe a similarity transformation that maps trapezoid PQRS to trapezoid WXYZ.

dilate: $(x, y) \to (\frac{1}{3}x, \frac{1}{3}y)$

reflection: $(x, y) \to (-x, y)$



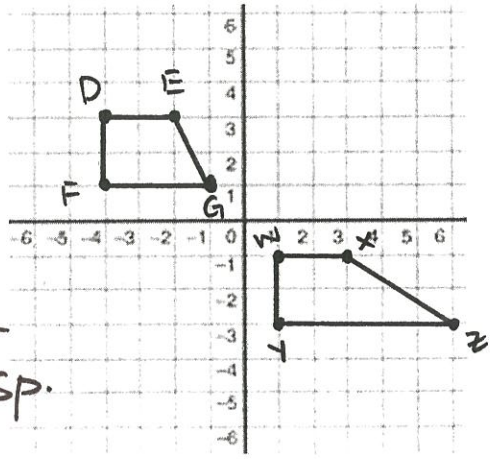
4. Determine whether the polygons are similar. Use transformations to explain your reasoning..

$\frac{DE}{WX} = \frac{2}{2} = 1$

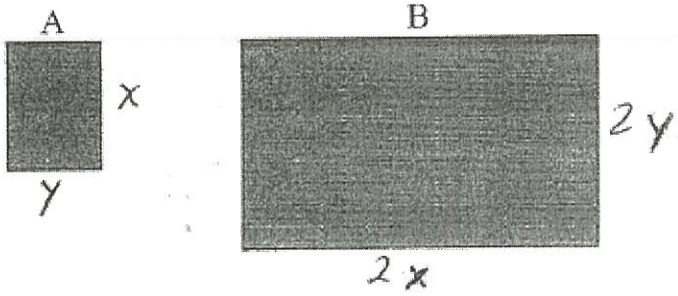
$\frac{DF}{WY} = \frac{2}{2} = 1$

$\frac{FG}{YZ} = \frac{3}{5} \neq 1$

The shapes are NOT similar since ratios of corresp. sides are not =.



5. Prove that the rectangles are similar.



*all corresp. ∠s are ≅ (all rt. ∠s are ≅)

$\frac{2x}{x} = 2$

$\frac{2y}{y} = 2$

} all corresp. sides are = in ratio

The rectangles are similar!